

The genus differs from *Fungia* in having the spaces on the intercostal grooves and the bars of the synapticulæ regular.

Some small corals lately brought from the Korean Sea have the shape, synapticulæ arrangement, and bifurcating costæ of *Micrabacia*; but the corallum resembles in its bipartite unsymmetrical growth the genus *Dioseris* of the Lophoserinæ.

Micrabacia Fittoni, described by the author in 1866, from the Gault, is placed in the same genus as *M. coronula* with much doubt. The type has been mislaid, and the figures exhibit characters some of which resemble those of *M. coronula*; but in the absence of the specimen, it is not quite certain what are the structures represented.

MISCELLANEOUS.

On the Copulation of Diffugia globulosa, Duj.

By Dr. CARL F. JICKELL.

COPULATION and conjugation have been but rarely observed in the Rhizopoda, and of the few statements relating to the subject some are susceptible of a different interpretation. Especially since the well-known observation of A. Gruber* upon the process of division in *Euglypha alveolata*, many of these statements may justly be regarded with doubt. For this reason I may here describe a process of copulation in *Diffugia globulosa* which I observed at Jena in December of last year.

One morning I found in a watch-glass, in which I was breeding Infusoria and Rhizopoda, two specimens of the *Diffugia* united. The animalcules clung together by the mouth-openings. Their carapaces were entirely filled with protoplasm, and further four very long pseudopodia, unusually lively in their movements, issued from the point of union of the two individuals. The carapaces were of equal size, but one of them much more transparent than the other. When the creatures were isolated by means of a fine pipette they still remained united. About the same time in the morning of the following day, therefore four-and-twenty hours later, the two animalcules were still united, and both carapaces were quite filled with protoplasm; but the action of the pseudopodia had ceased, and at the point of union of the two mouth-apertures not the smallest plasmatic thread was to be detected. Examination at the end of another twelve hours, or thirty-six hours after the first observation, showed no alteration, but the two carapaces remained, as in the morning, fully occupied by protoplasm without the least trace of pseudopodia. Twelve hours later

* Zeitschr. f. wiss. Zool. 1881.

(i. e. forty-eight hours after the discovery of the state) the two carapaces were separated.

After treatment with osmium-chromium-acetic acid and staining with picrocarmine, the two carapaces were mounted in shellac. When carefully crushed only one of them appeared to be filled with protoplasm, while the other was quite empty. I was able to recognize by definite characters that the carapace previously distinguished as the lighter one was now the empty one. In the isolated plasma of the darker-coloured carapace there were two entire nuclei and one in course of breaking up. The two entire nuclei showed in a lighter-coloured basal substance a great number of small darker corpuscles, and further a distinctly double-contoured, colourless, nuclear membrane was distinguishable. Among the products of disintegration of the third nucleus a darker-coloured central body is more or less clearly distinguishable within the less coloured principal mass.

I have interpreted the process above described as a copulation, although I did not observe the union of originally separate individuals. As there can be no question of division in this case it could only be urged against my interpretation that we might here have to do with the known process of rejuvenescence, in which an animal, after forming a new shell around the gradually protruding protoplasm, finally quits the old one. I think, however, that this objection will be disposed of by the observation of the lively pseudopodial action at the commencement of the process, as also by the breaking up of one of the nuclei, and by the fact that at the end of the whole process it was not the lighter but the darker carapace that contained the protoplasmic body. All this is not in accordance with the phenomena observed in rejuvenescence. I will also not omit to mention that a great number of *Diffugia* of the same species which were in the same watch-glass, on careful examination showed only one or two nuclei with a single large nucleolus.

If am not mistaken, then, in interpreting the observed process as a copulation, we obtain the following facts:—

1. In the Rhizopoda, as in the Infusoria, a copulation occurs.
2. As in the Infusoria a stage of depressed vital energy occurs here during the copulation.
3. As a consequence of the process there is also a breaking-up of the cell-nucleus.—*Zoologischer Anzeiger*, no. 174, August 18, 1884, p. 449.

How Lycosa fabricates her Round Cocoon.

Dr. H. C. McCook said that while walking in the suburbs of Philadelphia lately, he found under a stone a female *Lycosa* (probably *L. riparia*, Hentz), which he placed in a jar partly filled with dry earth. For two days the spider remained on the surface of the soil, nearly inactive. The earth was then moistened, whereupon (May 2) she immediately began to dig, continuing until she had made a cavity about one inch in depth and height. The top was then carefully covered over with a tolerably closely woven sheet of white